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Dynamic XRD, Shock and Static Compression of CaF_2 PATRICIA KALITA, PAUL SPECHT, SETH ROOT, Sandia National Laboratories, NICHOLAS SINCLAIR, ADAM SCHUMAN, Washington State University, MELANIE WHITE, ANDREW CORNELIUS, University of Nevada Las Vegas, JESSE SMITH, STANISLAV SINOGEIKIN, Carnegie Institution of Washington
— The high-pressure behavior of CaF_2 is probed with x-ray diffraction (XRD) combined with both dynamic compression, using a two-stage light gas gun, and static compression, using diamond anvil cells. We use XRD to follow the unfolding of a shock-driven, fluorite to cotunnite phase transition, on the timescale of nanoseconds. The dynamic behavior of CaF_2 under shock loading is contrasted with that under static compression. This work leverages experimental capabilities at the Advanced Photon Source: dynamic XRD and shock experiments at the Dynamic Compression Sector, as well as XRD and static compression in diamond anvil cell at the High-Pressure Collaborative Access Team. These experiments and cross-platform comparisons [1], open the door to an unprecedented understanding of equations of state and phase transitions at the microstructural level and at different time scales and will ultimately improve our capability to simulate the behavior of materials at extreme conditions. [1] S. Root *et al.*, Shock Compression Response of Calcium Fluoride. This Conference. *Sandia National Laboratories is a multi-mission laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.*

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